

Dear FCC,

\*Regarding the NPRM in ET Docket 04-37,

BPL is a system that uses frequencies and medium that will radiate and cause interference to several licensed services. The frequencies BPL uses in general is 1 to 80 Mhz (megahertz). This particular band of frequencies are known as HF (which is actually 1 - 30 Mhz). This part of the radio spectrum has very special properties not found elsewhere. With this band, one can communicate around the world with very minute power levels. This is due to the fact that radio waves in this band can bounce off the ionosphere multiple times to get to the destination. Other portions of the radio spectrum are essentially line-of-sight. This means that the signals cannot bend or bounce off the ionosphere, but they can only propagate like light - in a straight line.

The medium of BPL (the powerline cable), unlike any other broadband medium (copper twisted pair, fiber, coaxial cable), is inherently unsuited for carrying the frequencies BPL uses. Power lines, copper twisted pair, and coaxial cable all act like natural low pass filters, meaning higher frequencies are attenuated more than lower frequencies when attempting to transmit them through the medium. The exact slope of the graph of attenuation depends on the specific construction of the material, but in general, twisted pair is suitable up to 100 Mhz and coaxial cable can go up to about 3 Ghz. Again, these are very general figures and determining the suitability for any application depends on other factors. Power lines would be suitable for up to perhaps 20 KHz, maybe 350 kHz at a stretch, with caveats. The exact figure is unimportant for this discussion, but note that this is kilohertz, not megahertz or gigahertz. These are essentially audio frequencies, and equate to a data rate in the neighborhood of ISDN.

The other property of the medium chosen for BPL is its radiating capability. Again, unlike all other broadband mediums, power lines are excellent radiators of the frequencies BPL uses. Copper twisted pair, coaxial cable, and fiber are all inherently non-radiating mediums. It should be noted that twisted pair and coaxial cable do actually radiate to some extent, but in proportion to the amplitude of the signal they are carrying, it is minuscule. It's ironic that an antenna in use by some Amateurs actually is very close in construction and visual appearance to typical power lines.

BPL has been tested and deployed on a limited basis in other countries and was essentially REJECTED due to interference issues. BPL vendors may claim "new technology" and advances have now made it possible, but the fact is they can't change the laws of physics. High speed data must occupy a certain amount of "bandwidth" and power lines which were designed to operate at 60Hz will radiate RF that is applied to them. This is why we replaced ribbon cable with coax many years ago in TV reception, to minimize interference from the power lines among other sources. It works both ways, for reception and/or transmission, open wires will radiate. Only changing power line construction (i.e. coaxial cable) would eliminate this radiation. BPL proponents reject this as being too costly, but that would be the cost to make this a real viable technology.

Users of the affected radio spectrum cannot be relocated, or at least not economically or in a timely manner. It's likely it would be cheaper for

the government to subsidize cable and DSL deployment. Plus, all of the services that use HF bands require the characteristics that only HF bands exhibit. There would also be huge international treaty implications with any relocation. Changes in international communications treaties are measured in decades, not months or even years. Relocating government and military services alone would take years as the FCC would have to structure a migration plan. Chances are it would be ten years before this could be completed and it's likely that power companies will have run fiber to the home or DSL and cable will finally be ubiquitous. Perhaps the largest issue to tackle, though, is where to move these services in what is an already overcrowded spectrum.

If it was determined that relocation was the way to go, this would be very irresponsible as HF radio bands are a unique natural resource. No other radio spectrum can provide worldwide communications without any supporting infrastructure. The military (and Amateurs for that matter) have had satellites at their disposal for years, but HF is still in use as it provides unique capabilities that satellites just can't.

Destroying a large portion of wireless spectrum is not justifiable because it benefits more people. There are many examples of this in society where reallocation of a resource would benefit more people, but it would be detrimental long term to the people and the resource itself. Right now, amateur frequency allocations belong to the people internationally. You can enjoy them by simply passing a test and getting licensed. Once they are given to a business interest, they cease to be yours and you can only use them as a customer of that business. BPL impacts other groups including government, military, shortwave, aviation, maritime communications, and CBers, so this would have national security and international implications as well. BPL has been linked in some rhetoric with increasing "homeland security". BPL in fact takes spectrum away from government agencies directly tasked with protecting the country.

To deploy BPL an up front investment must be made in BPL headend/feed point equipment and repeaters -- it's not as simple as FCC Commissioner Powell thinks it as, like all powerlines can be easily lit up. There's going to be significant recurring costs in backhauling the IP traffic from the numerous BPL feedpoints serving an area. Neither DSL or Cable has this recurring cost or need for multiple network origination points. These costs unique to BPL make it even less attractive for deployment in rural areas that Cable or DSL as customer densities and revenue potential is lower. While it may be stated by BPL providers that initial metropolitan buildouts are needed to subsidize rural deployments, why would any for-profit company expand into rural areas when it's a losing proposition?

The scalability of BPL is questionable. Chunks of HF spectrum must be reused between repeater/feedpoint segments. With customer bandwidth requirements going up, over subscription ratios going down, systems will need to be segmented in a cellular fashion. This exacerbates the interference issue as more frequency chunks are in use in a given area. More avoidance of frequencies (i.e. notching) will be needed, making less spectrum available for use by BPL. The frequency chunks in use will need to be smaller to enable tighter frequency reuse, and the available bandwidth per feedpoint will get to a point where it won't be sufficient.

BPL is also lacking on the regulatory front. It has no protection from interference from licensed wireless services. This means your BPL provider has

no recourse if a licensed wireless station knocks out your BPL service regularly.

Power companies should be building for broadband dominance in the coming decades and beyond with viable technology like fiber, not for the next year or two with doomed-for-obsolescence technology. If the utility companies are in a frenzy to get their proverbial "foot in the door" before telcos and cable companies snatch up their potential customers, fiber delivery to the last mile and 802.11 wireless on poles for the last 100 feet makes a ton of sense. This is not a new idea and some carriers are doing it now.

In summary, the risk to licensed HF services is too great, the technological and regulatory foundation of BPL is too weak, and when compared head-to-head with other technologies, BPL loses both on the business model and technical capability side. BPL looks all glittery, but in reality it will do nothing but render the hf/vhf spectrum unusable for weak signal work just for a few less than 1Mb/s internet connections that will be less than reliable, and these speeds are already available with much better technologies that are closed systems. It would be a crime against nature to destroy the hf spectrum.

Respectfully Submitted,

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